



FLEXIBLE SERVICE AGREEMENT

FOR ELECTRICAL SUBSTATIONS

Improving Operational
Performance and
Business Outcomes

FOCUSING ON YOUR BUSINESS OUTCOMES

Substation operators and owners are constantly facing new challenges, but the need to deliver consistent outcomes remains. That's where GE's Flexible Service Agreements can help. By partnering with GE on a long term, outcomes focused approach, customers can realize the full potential of their electrical substations and network connected assets to more effectively balance performance, resources, and investments, letting you get back to focusing on what matters most.

Up to 50% of initial project cost is typically spent on O&M during the lifecycle of a substation

35% of electrical T&D technicians are above the age of 53

1% of unplanned downtime due to a power outage can cost some Industrials up to \$5M



GE'S SOLUTION

ENSURING ASSET AVAILABILITY AND IMPROVED OPERATIONS & MAINTENANCE COSTS

With a dedicated team of engineers and specialized service technicians with deep technical skills and knowledge, GE provides its customers with Operations and Maintenance (O&M) services through customized Flexible Service Agreements (FlexSA). These service agreements are powered by specialized expertise and Asset Performance Management (APM) systems to lower the operational and financial risks for grid asset owners and operators.

GE's Flexible Service Agreements delivers advanced planning and reduces costs up to guaranteed operational outcomes covering a wide range of substation assets including, high and medium voltage equipment, substation and fleet from GE or other OEMs, as well as protection and control systems.

Each flexible agreement is tailored to meet the needs and objectives of substation and network operators. The broad set of options are applicable considering asset conditions and criticality, location, customer expertise and resource availability. Contract duration can vary from one year to decades.

GE'S FLEXSA CAN BE APPLIED ACROSS POWER SYSTEM APPLICATIONS

Renewable Generation



Thermal Generation



Transmission & Distribution

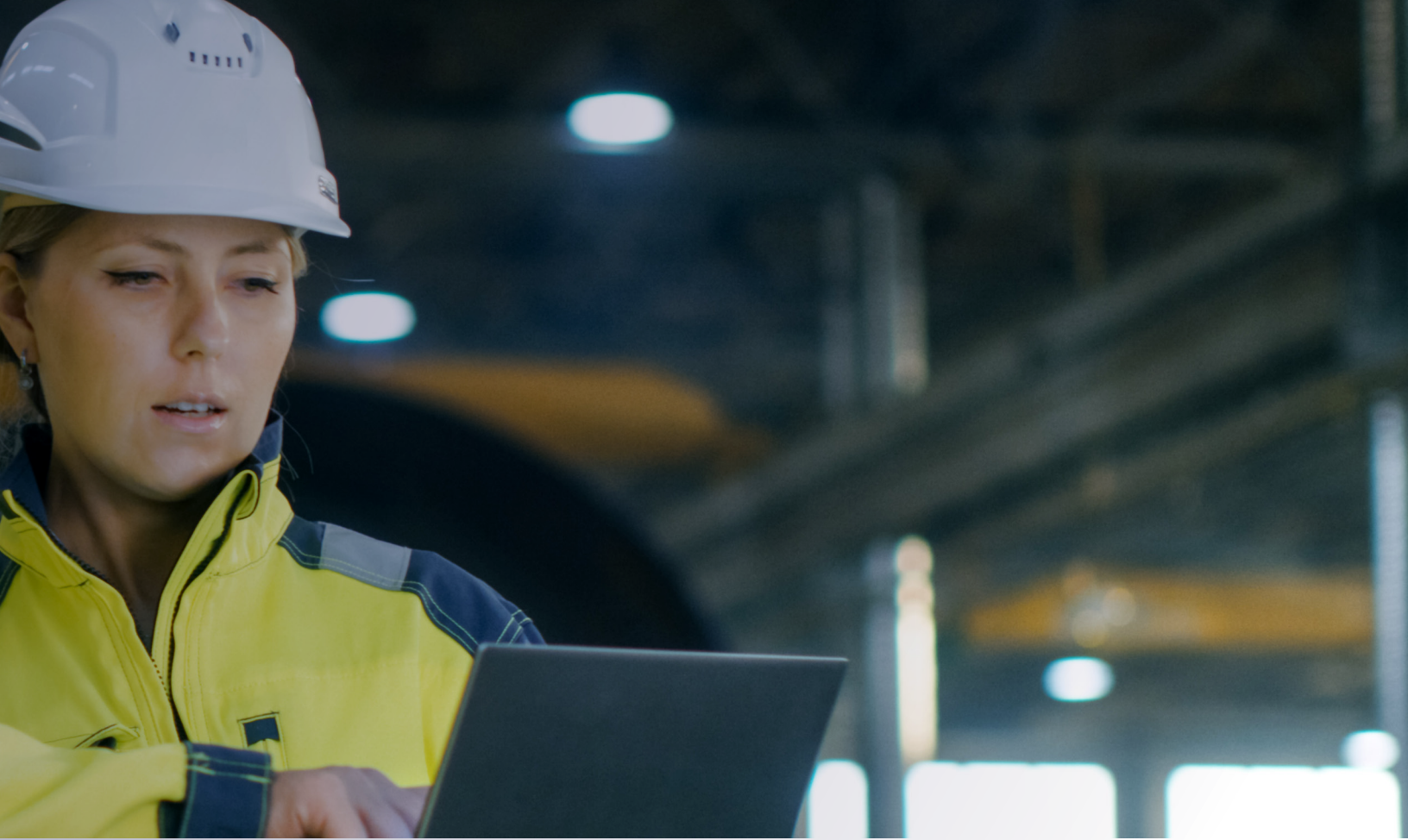


Industry



Infrastructure





LEVERAGING A GLOBAL FIELD & PRODUCT EXPERIENCE

GE has a unique T&D equipment knowledge base gained through the design, manufacturing, installation, maintenance, repair, and modernization of high voltage projects for over a century. The extensive expertise captured over the decades has enabled GE's service engineers to better understand aging processes and failure modes, thus allowing them to make recommendations on the best service agreement options to fit each customer's specific needs and outcomes.



Tailored Solutions

The service agreement is aligned to fit with each customer's O&M strategy. The customized solution is built from a unique selection of options



Fixed Cost and Planned Outage

Costs are contractually guaranteed with the option for works to be planned out months in advance during outages scheduled with the customer



Increased Availability

Leveraging GE's APM solutions and product behavior expertise, the number of failures can be reduced up to 50%, limiting outage frequency and duration



Secured Mobilization

The mobilization time can be reduced up to 85%, versus transactional services, providing required resources at the right time no matter the location



Outcome-based

Through outcome-based contracts associating APM and specialized supplier expertise, GE can commit on availability, reliability, or other mutually agreed upon performance metrics

A TAILORED SERVICE CONTRACT TO MEET CUSTOMER OUTCOMES AND RISK PROFILE

GE's Grid Solutions Services team partners with T&D operators and industrials to select only the support options they need. Our field service specialists take asset criticality, fleet size, location, in-house capabilities, system complexity and business profile into consideration to build and define a solution tailored to each customer's needs.

GE's Flexible Service Agreements can cover equipment from other manufacturers, reducing the complexity and costs associated with establishing and managing service agreements from multiple manufacturers. With GE, each customer works under one contract with a single service provider to help reduce administrative costs and speed response time.



PREVENTIVE MAINTENANCE

Minimize Unplanned Outages



CORRECTIVE MAINTENANCE

Minimize Repairs



LOCAL OPERATION

Daily Inspection



STRATEGIC SPARE PARTS MANAGEMENT

Secure Supply Chain



24/7 HOTLINE

Fast Response Time



ASSET PERFORMANCE MANAGEMENT

Improve Performance



TECHNICAL TRAINING

Manage Knowledge



CYBERSECURITY SOLUTIONS

Enforce Compliance



Through outcome-based contracts, GE can ensure the performance and availability of the system in order to ensure long-term value. By offering substantial guarantees and increased risk sharing flexibility, GE customizes each agreement to the business outcomes and objectives of each operator and substation they manage.

GUARANTEED OUTCOME OPTIONS



Spare Parts Availability & Cost

Components required to repair failed parts



Labor Availability, Level & Cost

Resources required to perform repairs



Response Time

Remote expert availability



System Performance

Additional services to guarantee system reliability and availability



Obsolescence Management

Maintain the supply chain in order to procure GE parts

DETAILED CUSTOMER SERVICE PACKAGES



PREVENTIVE MAINTENANCE Reducing unplanned outages

Planned inspection services include:

- Planning and scheduling with the substation's local and central operation teams as per programmed maintenance schedule
- Preventive maintenance tasks
- Shutdown/outage related to testing & measurement
- Preparation and delivery of maintenance report
- Recommendation for replacement or repairs when required



LOCAL OPERATIONS Delivering improved capacity and reliability

The first responder support is activated through the acknowledgement of alarm and event logs. It includes:

- Planning and scheduling of inspection patrols
- Replacement of standard consumables as per OEM manuals
- Minor corrective maintenance tasks as per programmed first responder manual
- Preparation of inspection patrol reports

Issues are communicated to GE's field specialists within 30 minutes. Switching operations are performed as per dispatching center's instructions and clearance procedures are followed during maintenance and repair activities.



CORRECTIVE MAINTENANCE Repairing unexpected failures

The corrective maintenance if a failure occurs can include:

- Workshop and laboratory diagnostics and testing
- Onsite repair using high-precision testing equipment to solve complex issues that may arise
- Troubleshooting and measurement
- Troubleshooting of protection and automation systems through a secured remote link from GE service center
- Critical parts replacements and substation re-energization



STRATEGIC SPARE PART MANAGEMENT Securing the supply chain

Programs and options focus on the main and critical components. These programs ensure parts availability and obsolescence management.

For legacy parts being discontinued a last bulk purchase is available, enabling customers to cover future replacements.

A spare parts pooling program can be set through a specific Services Agreement, where a group of customers can share a pool of critical spares and components for GIS and GCB, with a field specialist deployed to your site within 24 hours of a failure



24x7 SUPPORT

Providing fast response times

The 24x7 support includes access to the required technical expertise in primary and secondary equipment and periodic reporting of all site interventions, unplanned maintenance activities and open issues. Two options are offered:

- The remote support with a single point of contact for 24x7 phone-based technical support for GE equipment with a maintenance specialist to assess the issue and recommend remedial actions
- The on-site support via the 24x7 first responder support with field engineers provided at site based on planning availability or following the response time guaranteed through the Flexible Service agreement



TRAINING

Enhancing team know-how and productivity

GE's Technical Institutes provide training through advanced methodologies with virtual session, e-learning, theoretical courses, hands-on training using actual equipment, and competence development programs that help you:

- Build a training plan best adapted to your teams' needs
- Perform on-site services activities independently
- Maintain peak equipment performance in a safe environment

Our technical training offering includes competence development programs, product training and safety-related courses



ASSET PERFORMANCE MANAGEMENT

Enabling an outcome-based agreement

EnergyAPM, GE's Grid Solutions software ecosystem provides an Asset Performance Management portfolio of applications and services, including:

- A centralized management of historical and condition data that are stored, organized and normalized. It includes data collected during field inspection, through online sensors and monitoring devices
- Automated diagnostics and prognostics accelerating data analysis to predict failures before they occur
- Risk assessments to prioritize maintenance activities, focusing on what matters most based on asset condition and behavior, enabling GE to deliver outcome-based agreements



CYBER SECURITY SOLUTIONS

Enabling regulatory compliance

GE's cyber security solutions help manage cyber risks across the installed base of assets that may or may not be able to meet today's security challenges, while adhering to evolving regulatory requirements. Services can include:

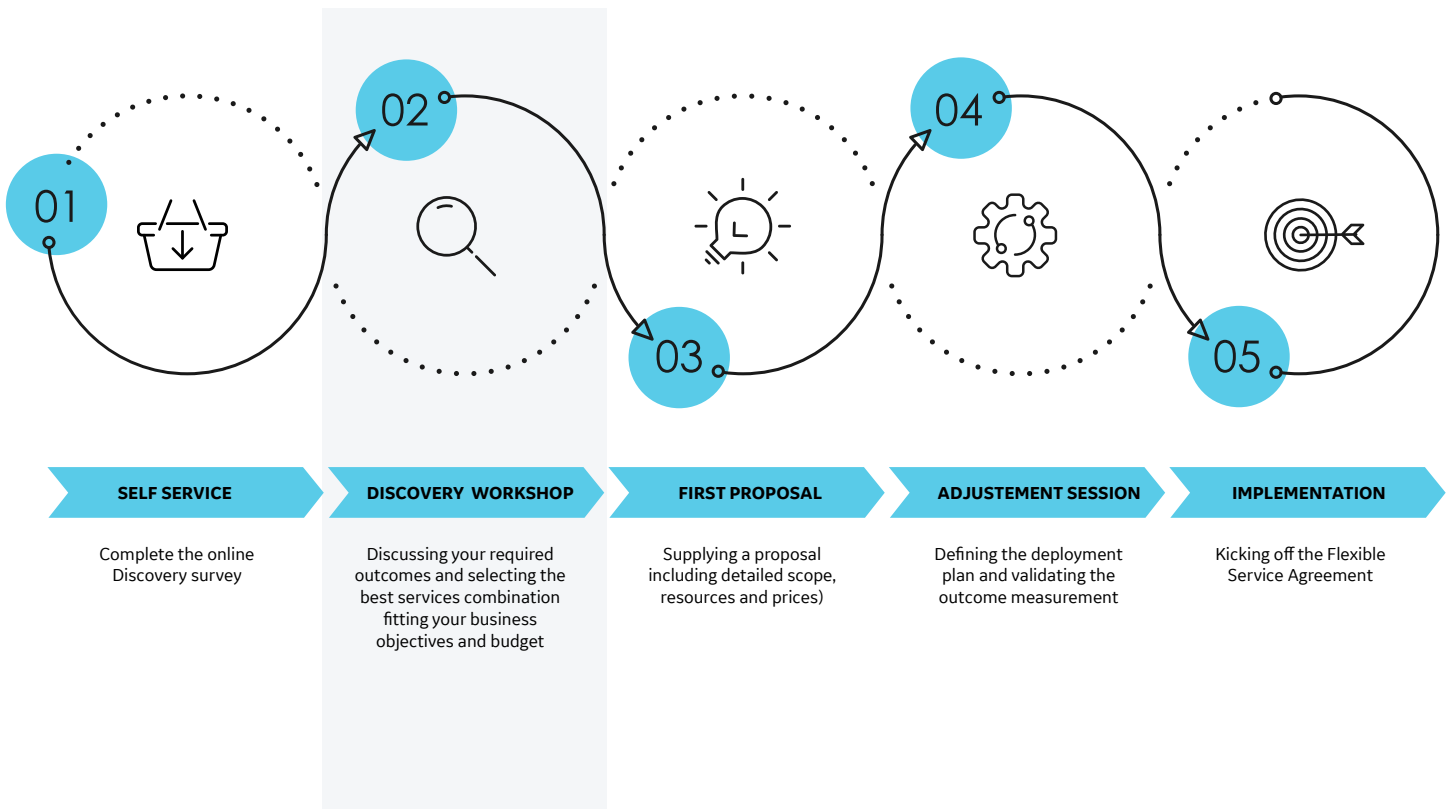
- Non-Disruptive Security Assessment including health check, compliance assessment and risk assessment
- Security enhancement including consulting, integration, commissioning & testing, patch management and NERC-CIP compliance
- Security training covering security awareness, understanding risks and security controls

CLOSELY PARTNERING WITH OUR CUSTOMERS

To help achieve business goals, as part of GE's service, customers are connected with GE experts who provide insights on asset behavior, processes and procedures to improve operations and maintenance productivity.

GE closely collaborates with each customer and associated key stakeholders to identify the target outcomes in a discovery workshop. The process starts with understanding the current situation, capabilities, identifying the challenges and pain points. Then the gaps to reach the target outcomes are identified and acknowledged by evaluating the potential Return on Investment (ROI) of the proposed solution.

Our Approach: A Journey to Operational Peace of Mind



OFFSHORE AND ONSHORE SUBSTATION MAINTENANCE

CASE STUDY



Customer: T&D Utility



Application: Offshore Wind Farm



Country: Germany

Customer Challenge

Germany seeks to generate 80% of its energy consumption from renewable sources by 2050. Tennet is responsible for extending the grid to the German North Sea notably through the 900 MW Voltage Source Converter (SVC) Dolwin3 project, energized by GE in November 2020.

GE's Solution

A five-year agreement to maintain both an AC offshore 155kV substation and an onshore 380kV DC/AC converter station using VSC technology. The service agreement covers more than 33,000 assets including:

- Maintenance of the HV, MV, LV, auxiliary systems plus steel and coating for the offshore substation
- Inspections and condition assessment
- Preventive and corrective maintenance
- Repair and spare parts management
- Technical support line with fast response

Customer Benefits

- Optimized performance of the HVDC system
- GE project management includes outage, material and waste management with a monthly maintenance intervention and a yearly outage campaign scheduled
- Condition-based maintenance strategy is implemented, preventing unexpected failure

24/7 SUPPORT TO INCREASE FLEXIBLE AC TRANSMISSION SYSTEM AVAILABILITY

CASE STUDY



Customer: T&D Utility



Application: FACT System



Country: USA

Customer Challenge

The STATCOM system installed in 2004 was suffering from a lack of reliability due to limited maintenance, shortage of spares and obsolescence on electronic boards. The customer decided to invest in a plan to restore system availability.

GE's Solution

A 10-year service agreement including:

- 24/7 technical support with a 5-hour guaranteed on-site intervention
- Single point of failure analysis
- Refurbishment of obsolete boards and replacement of obsolete parts
- Spare part management with maintenance of obsolete spare parts and on-demand delivery

Customer Benefits

- The FACTS substation performance is back to the required level reaching 99,2% availability per year gaining 10 points compared to the period without service agreement coverage
- The lifetime of the system has been extended by an additional 10 years, postponing the replacement investment.

AIRPORT DISTRIBUTION NETWORK OPERATIONS AND MAINTENANCE

CASE STUDY



Customer: Infrastructure



Application: Airport



Country: India

Customer Challenge

This large international Indian airport relies on an uninterrupted power supply to serve over 65 million passengers yearly. To protect its reputation and avoid penalties caused by power interruptions, the operators requested needed support to operate and maintain the substation's critical equipment.

GE's Solution

A multi-year agreement to operate and maintain the distribution network composed of GE and other OEM 250+ panels, 66kV bays, 50 MVA transformers and 11kV diesel generators, including:

- O&M including emergency back-up supply through generators
- Dedicated team of GE field engineers on site 24x7
- Emergency and maintenance interventions as required
- Inspection and health condition assessments
- Root cause, MTBF and MTTR analysis

Customer Benefits

- 99.5% network uptime with Increased asset life through the implementation of an OEM-recommended preventive maintenance plan, optimizing total cost of ownership
- Response time on failure provided within 20 minutes with quick identification of fault and a back up restoration time within 50 sec.in case of power outage
- Customer awarded GE for the EHS and statutory compliance



For more information about
GE's Flexible Service Agreements visit
www.GEGridSolutions.com/FlexSA

GE reserves the right to make changes to specifications of products described at any time without notice and without obligation to notify any person of such changes.

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